The CBR wizard will enable users to model the dispersion of contaminants and the extent of their impact on facilities in the contaminated area.

activity type; scheduled hours of operation, etc.) will be extracted from existing installation databases to allow emergency responders and force protection planners to identify type and extent of vulnerabilities and develop plans to mitigate impacts.

Integrated AT/FP Screening Tool

The Integrated Anti-Terrorism/Force Protection (AT/FP) Screening Tool will help designers evaluate Army Installation Force Protection needs and requirements. The tool will be in the form of a modified Leopold Matrix that will provide a rating on the relative level of criticality of various Mission Essential Vulnerability Areas and High Risk Targets (MEVAs/HRTs) or Single Points of Failure (SPF) on an Army Installation. The rows of the matrix will be populated with information on specific "Installation

Features" such as type and location of critical buildings, access control point (ACP), or utilities. The columns of the matrix will be populated with "Force Protection Factors" such as actions used to mitigate blast effects, protect against CBR, or to enhance physical security. A third dimension of the matrix will be the "Threat Probability." The cells at the intersections of these rows/columns will provide a rating of the importance of those specific Force Protection Factors for each Installation Feature for a given threat probability. Each matrix cell will also provide information on where to find the relevant references on applicable DoD/Army policy and recommendations for achieving the recommended level of protection and courses of action for the identified MEVAs, HRTs, and SPFs.

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Modeling and Simulation for Force Protection

Background

Fort Future is a research program designed to produce capabilities critical to the Army's ability to transform its installations in the tight timeframe required to support our emerging forces. Much as field commanders gain a superior advantage by visualizing the battle space, installation planners will be able to make strategic decisions by visualizing results of many different scenarios.

The U.S. Army Engineer Research and Development Center (ERDC) is conducting Fort Future research and development in support of the Assistant Chief of Staff for Installation Management (OACSIM). Fort Future will create a system-of-systems that unites existing and new computer models to form a "virtual installation." Building on currently available and planned Standard Army Management Information Systems (STAMIS) that provide a snapshot of the present, Fort Future will use modeling and simulation to help decisionmakers explore potential consequences of their decisions.
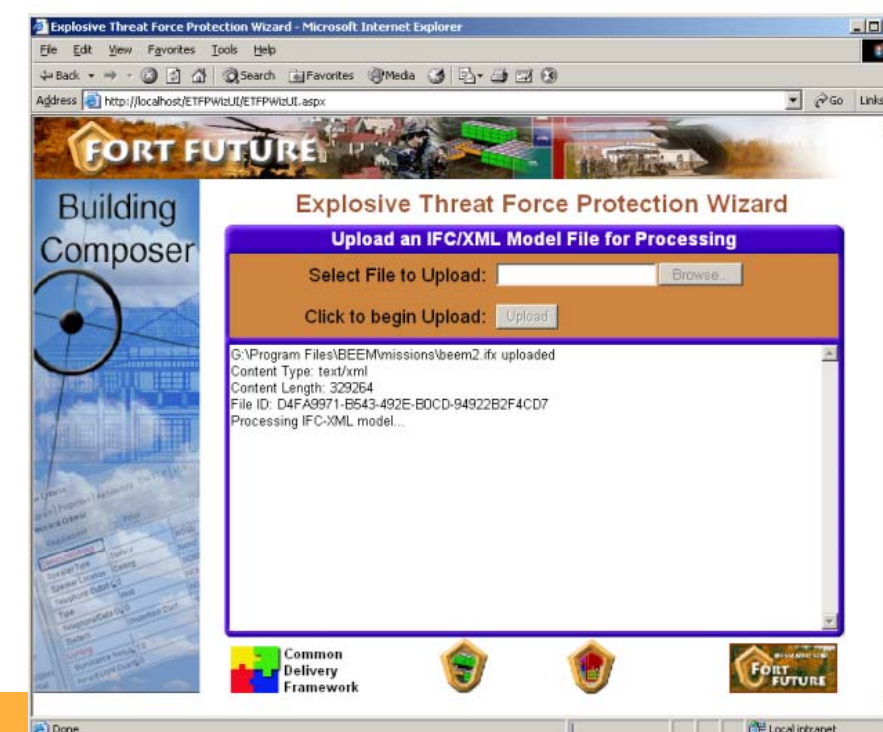
Problem

Military threats have significantly changed since the end of the Cold War. The recent attacks on U.S. interests at home and abroad have fundamentally changed the perception of terrorist risk to Army installations. Installations are prominent targets of aggressors as both symbolic targets and because of their key role in combating terrorism. As a result, force protection will be a high priority of DoD installations, increasing the need for effective force protection planning.

Army Installation personnel, mission operations, and facilities are vulnerable to various aggressor threats which include explosives and releases of chemical, biological and radiological (CBR) agents. Facility planners, designers, and operations and maintenance (O&M) personnel need improved capabilities to determine the vulnerabilities of new and existing facilities and to identify the most cost-effective countermeasures for reducing risk.

Approach

To provide a Force Protection capability for Fort Future, researchers will develop decision-support tools to help reduce the vulnerability of an installation's operations and personnel. The initial focus will be on integrating existing software tools on the world wide web to evaluate the effects of terrorist explosive and airborne chemical/biological attacks on buildings. This capability will be extended to the overall installation infrastructure and will consider

The web-based Explosive Threat Protection Wizard will provide automated capabilities to determine the a facility's vulnerabilities and identify cost-effective countermeasures to reduce risk.

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14. ABSTRACT
The Fort Future force projection module is being developed to optimize, through simulation, the process of preparing and deploying equipment and personnel. The module will use a graphical user interface (GUI) to integrate data input through operational history, strategic planning, and hypothetical tactical scenarios, to evaluate existing force projection capabilities and plan future upgrades ? ultimately to meet Objective Force requirements. Utility systems are ?enablers? for the force projection process in that they provide the electricity, water, transportation fuel, heating, cooling, compressed air, and communications required for the various steps of force projection. This work will develop methods, simulation tools, and models to enable installation and military planners to plan, assess, optimize, and monitor the ability of utility systems to support Army force projection. The system will enable the user to conduct utility system simulations using real-time data, as well as historical, generic, or hypothetical scenarios.

15. SUBJECT TERMS
decision support tools; Fort Future; installation planning; integrated software; military facilities; simulation modeling; force protection

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Data is imported from *Building Composer* into BEEM to generate building and installation models for explosive threat analysis.

physical security to ensure mission accomplishment. These integrated software tools will assist designers, planners, operators, owners, and users in assessing their level of readiness for attacks against the infrastructure and personnel, and in determining and evaluating alternative options for minimizing vulnerability.

Tools

Wizards

Wizards are software components that operate on a discrete design task by taking information and user input to create or manipulate a model rapidly, all according to generally recognized or organization-specific practices. A Wizard extends program functionality by "knowing" how to use data to create or analyze input information in a useful way.

Explosive Threat Force Protection Wizard

The Explosive Threat Force Protection Wizard provides safety and master planners the ability to generate building and installation models for explosive threat analysis. The wizard automatically extracts information about the building and site from the Fort Future installation model. The planner then uses the Blast Effects Estimation Model (BEEM) to define threats and analyze the resulting damage in a 3-D view. This allows the planner to establish stand-off distances and evaluate various protective strategies.

This tool leverages BEEM, which provides the front-end for established and validated modeling codes including the blast effects analysis of the Army's

Anti-Terrorism Planner (AT-Planner) and the ballistic effects of the Navy's Force Protection Tool (FPT). BEEM is being developed for the Counter Terrorism Technical Support Office (CTTSO) Technical Support Working Group (TSWG).

Minimum AT Standards for Buildings Wizard

The Minimum AT Standards for Buildings (MATSB) Wizard will be a web-based software tool that will aid facility planners and designers to ensure that all of the applicable minimum antiterrorism/force protection standards that are addressed in Unified Facility Criteria (UFC) 4-010-01, *DoD Minimum Antiterrorism Standards for Buildings*, are properly identified and included in the project requirements. Initially, the wizard will prompt the User for project-specific input and then walk the User through a decision-tree process

Sample BEEM blast-damage assessment: blast located at ground level "x"; colors differentiate degree of damage.

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to determine and identify the project's applicable minimum antiterrorism/force protection requirements. Ultimately, the wizard will extract data directly from Building Composer and output protection requirements with minimal User input.

CBR Wizard

The CBR Wizard is a web-based software tool that will aid facility planners and designers, emergency responders, and force protection planners to identify potential vulnerabilities of individual existing and planned facilities and installations to the threat of CBR attacks. Users will have the ability to create or import a facility/installation model, create and run a variety of threat scenarios, and view and store the results. The CBR Wizard will consist of two distinct modules — an internal module and an external module.

The CBR Wizard (internal) module will focus on scenarios in which contaminants are released within a facility. The primary users will be facility planners and designers who will use the tool to

model the dispersion of internally released contaminant. Facility planners and designers will be able to modify the building configuration, rerun the model, and compare the results. Emergency responders and force protection planners will also be able to conduct similar analyses, enabling them to analyze the vulnerability of the subject facility and suggest improvements to the facility or develop plans to mitigate the threat or develop emergency response plans.

The CBR Wizard (external) module will address scenarios in which contaminants are released external to a facility, either inside or outside of an installation's perimeter. The primary users will be installation emergency responders and force protection planners. The wizard will enable the users to generate an installation model or import an installation model from an existing GIS database and then create a variety of threat scenarios, including weather inputs, contaminant characteristics, release location and method, time of day, etc., to determine dispersion of the contaminant and extent of impact on facilities in the contaminated area. Affected areas will be represented visually. Facility-specific information on buildings in the affected area (e.g., type of CBR protection employed, if any; number of occupants; unit

The MATSB web-based software tool (Wizard) will help facility planners and designers ensure that all applicable minimum antiterrorism/force protection standards are addressed.